Jinsong Chen

Lawrence Berkeley National Laboratory
MS 90-1116, 1 Cyclotron Rd, Berkeley, CA 94720
Tel: (510) 486-6842   Fax: (510) 486-5686 Email: jchen@lbl.gov

HIGHLIGHT OF PROFESSIONAL EXPERTISE

- Advanced knowledge in hydrology, hydrogeology, and environmental fluid mechanics. Extensive experience in modeling of flow and contaminant transport and analysis of water resources systems.

- Substantial knowledge in applied geophysics, including electrical, magnetic, electromagnetic, gravity, and seismic methods. Knowledge in geophysical data interpretation and inversion.

- Advanced knowledge in statistics, including linear models, generalized linear models, multivariate analysis, time series analysis, spatial statistics (geostatistics), Bayesian methods, and Markov Chain Monte Carlo (MCMC) methods. Extensive experience in development of statistical and geostatistical models.

- Extensive experience in multi-disciplinary data analysis and integration for improved subsurface characterization and enhanced reservoir imaging. Datasets analyzed include physical, geological, geophysical, hydrogeological, and geochemical data.

- Demonstrated abilities to conduct inter-disciplinary research involving hydrology, hydrogeology, and geophysics using integrated approaches. Abilities to develop innovative methodologies to solve a variety of complex geosciences and environmental problems.

EDUCATION

Ph.D.	(Environmental Engineering) University of California, Berkeley, CA	2001
	Thesis: *Bayesian Approach for Subsurface Characterization Using Hydrogeological and Geophysical Data.*	
M.A.	(Statistics) University of California, Berkeley, CA	2001
M.S.	(Environmental Fluid Mechanics) Georgia Institute of Technology, Atlanta, GA	1997
M.Eng.	(Water Resources and Hydrology) Tsinghua University, Beijing, China	1990
B.S.	(Applied Mathematics) Tsinghua University, Beijing, China	1988
B.Eng.	(Water Resources Engineering) Tsinghua University, Beijing, China	1988

PROFESSIONAL EXPERIENCE

Postdoctoral Fellow   01/2003-Present
Earth Science Division, Lawrence Berkeley National Laboratory, Berkeley, CA

- Developed a joint inversion approach to estimate fracture zonation along several cross sections at the DOE NABIR Field Research Center in Tennessee, using seismic travel time, flowmeter test data, and Markov chain Monte Carlo methods.

- Investigated the potential of integrating high-resolution seismic AVO and one-dimensional electromagnetic data for enhanced gas reservoir imaging by developing a joint stochastic inversion model based on the reversible jump Markov chain Monte Carlo method.

- Developed a stochastic model to simultaneously invert seismic tomographic P-wave and S-wave travel time data under the constraints of two-dimensional electromagnetic data and other borehole measurements using Markov chain Monte Carlo methods.

Postdoctoral Fellow   01/2002-12/2002
Institute of Environmental Science and Technology, UC Berkeley, CA

- Analyzed a complex dataset, including physical, geophysical, hydrogeological, geochemical, and biogeochemical data, collected from the DOE South Oyster Bacterial Transport Site in Virginia, using advanced data mining and analysis techniques to find possible petrophysical relations among the diverse subsurface properties.

- Developed an effective statistical model based on data collected at the DOE South Oyster site to estimate the spatial distribution of field-scale extractable $Fe(II)$ and $Fe(III)$ concentrations using the inverted ground penetrating radar (GPR) tomographic attenuation data, the borehole lithofacies logs, and the Gibbs sampling method.

Research Assistant   08/1997-07/2001
Department of Civil and Environmental Engineering, UC Berkeley, CA

- Explored the use of high-resolution GPR tomographic velocity, GPR tomographic attenuation, and seismic tomographic velocity for hydraulic conductivity estimation based on data collected at the DOE South Oyster site in Virginia by developing the Bayesian model based on the normal regression method.

- Developed a Bayesian model to combine small-scale electrical resistivity logs with large-scale electromagnetic survey data for mapping two-dimensional resistivity fields based on data collected at the Lawrence Livermore National Laboratory site in California.

- Developed a Bayesian model coupled with a fuzzy neural network to alleviate the difficulty of using geophysical data for lithofacies estimation due to the non-linearity of cross correlation between lithofacies and geophysical attributes.

Teaching Assistant   08/2001-12/2001
Department of Statistics, UC Berkeley, CA

- Taught the statistics course, *Introduction to advanced probability*, for graduate students with diverse backgrounds, and obtained an overall score of 6.3/7 (excellent) in the official student evaluation.

Research Assistant   08/1995-07/1997
Department of Civil and Environmental Engineering, Georgia Tech, GA

- Generated two-dimensional fractured random fields, and developed a numerical model to simulate flow and contaminant transport in the synthetic fields.

Research Scientist and Lecturer   08/1990-06/1995
Department of Hydraulic Engineering, Tsinghua University, Beijing, China

- Developed a numerical model to simulate seawater incursion in a coast city of Southern China, and provided a critical evaluation on the use of groundwater resources, environmental protection, and water management to the local government.

- Investigated the interaction between surface and subsurface water in a large irrigation system of Northern China (over 533,600 hectares), and provided insight into the development of sustainable agriculture in the area.

- Developed a model to simulate a large-scale water transfer system from Southern China to Northern China (about 1,300 km), and provided important scientific results to the central government of China.

- Taught and developed several courses, including *Soil Physics, Surface Water Hydrology, Groundwater Hydrology,* and *Water Resources Systems Analysis*, and supervised 4-5 undergraduate students each year for their diploma projects.

PROFESSIONAL ACTIVITIES

- Referees for the following journals: *Water Resources Research, Environmental Sciences and Technology, Geoderma, and Journal of SPE.*

- Presentations to the following institutes: UC Berkeley, Stanford University, Ohio State University, Lawrence Berkeley Lab, AGU Fall Meeting in San Francisco.

- Search Committee, Research Scientist, Indoor Environment Department, Lawrence Berkeley National Laboratory, 2003.

PROFESSIONAL MEMBERSHIPS

- American Geophysical Union (AGU)

- American Statistical Association (ASA)

- Society of Exploration Geophysicists (SEG)

SELECTED AWARDS

- Jane Lews Fellowship, College of Engineering, University of California, Berkeley, CA, 2000.
- Li/Tucker Fellowship, Department of Civil and Environmental Engineering, University of California, Berkeley, CA, 1999.
- Excellent Paper Award from the Chinese Hydro-energy Technique and Economy Association for the paper entitled "*Self-optimization problems in large-scale water resources systems*", 1994.
- Excellent Young Faculty Award, Tsinghua University, Beijing, 1993.
- Lin Chia-qiao Applied Mathematics Award, Tsinghua University, Beijing, 1990.
- Excellent Master Degree Thesis Award, Graduate School of Tsinghua University, Beijing, 1992.
- Bachelor's (5-year program, 1988) and Master's (2-year program, 1990) Degrees, with distinguished honors, Tsinghua University, Beijing.

PUBLICATIONS (Part I: Papers in Refereed Journals)

Chen, J., and S. Hubbard, Estimating hydrogeological zonation in fracture media using high-resolution geophysical data and a sampling-based Bayesian model, *Water Resources Research,* in preparation.

Chen, J., S. Hubbard, Y. Rubin, C. Murray, E. Roden, and E. Majer, Geochemical characterization using geophysical data and Markov chain Monte Carlo Methods: a case study at the South Oyster Bacterial Transport Site in Virginia, *Water Resources Research,* submitted.

Chen, J., and Y. Rubin, An effective Bayesian model for lithofacies estimation using geophysical data, *Water Resources Research,* 39(5), 2003.

Chen, J., S. Hubbard, and Y. Rubin, Estimating the hydraulic conductivity at the South Oyster Site from geophysical tomographic data using Bayesian techniques based on the normal linear regression model, *Water Resources Research*, 37(6), 2001.

Hubbard, S., J. Chen, J. Peterson, E. Majer, K. Williams, D. Swift, B. Mailloux, and Y. Rubin, Hydrogeological characterization of the South Oyster Bacterial Transport Site using geophysical data, *Water Resources Research*, 37(10), 2001.

DeFlaun, M., …, J. Chen, and Others, Breakthroughs in bacterial transport, *EOS Transactions*, Article, 82(38), 2001.

Ezzedine, S., Y. Rubin, and J. Chen, Bayesian method for hydrogeological site characterization using borehole and geophysical survey data: theory and application to the Lawrence Livemore National Laboratory Superfund Site, *Water Resources Research*, 35(9), 1999.

Chen, J**.,** and X. Lin, Self-optimization of water resources systems simulation, *Journal of Tsinghua University (Science & Technology)*, 34(2), 1994.

Chen, J., and X. Lin, Self-optimization problems in large-scale water resources systems. *Hydro-energy Technique and Economy*, 49(2), 1993.

PUBLICATIONS (Part II: Papers in Conference Proceedings)

Chen, J., S. Hubbard, and J. Peterson, A comparison between hydrogeological characterization approaches applied to granular porous and fractured media, *The Proceedings of International Symposium of Dynamics of Fluids in Fractured Rock*, Berkeley, California, February 10-12, 2004.

Chen, J. and M. Hoversten, Joint stochastic inversion of geophysical data for reservoir parameter estimation, *Expanded Abstracts of SEG International Exposition and 73rd Annual Meeting*, Dallas, Texas, October 26-31, 2003.

Chen, J. and Y. Rubin, Characterizing lithofacies from borehole and cross-well geophysical data using Bayesian methods coupled with fuzzy neural networks, *The Proceedings of International Groundwater Symposium,* Berkeley, California, March 25-28, 2002.

Chen, J**.,** and X. Lin, Sensitivity analysis of weight vectors in multiple criteria decisions, *7th SESC (System Engineering Society of China) Annual Conference Papers,* 1992.

Chen, J., and X. Lin, Multi-objective decision theories and methods in large-scale hydraulic engineering, *Collection of System Engineering Papers on Hydraulic Engineering,* 1990.

PUBLICATIONS (Part III: Selected Abstracts)

Chen, J., S. Hubbard, and J. Peterson, A stochastic integrated approach to parameter estimation using geophysical data, *Annual Review of Earth Sciences Division of Lawrence Berkeley National Laboratory*, 2003.

Chen, J**.**, S. Hubbard, M. Fienen, T. Mehlhorn**,** and D. Watson, Estimation of hydrogeological zonation at the NABIR Field Research Center using high-resolution geophysical data and Markov Chain Monte Carlo methods, *EOS Transactions*, 84(46), 2003.

Rubin, Y., J. Chen, Z. Hou, M. Kowalsky, and S. Hubbard, Bayes, Zadeh, and Shannon, and the development of a structured approach to the hydrogeological data fusion problem, *EGS-AGU-EUG Joint Invited Assembly, 2003, Nice, France, Geophysical Research Abstract 5, 02403,* 2003.

Chen, J**.**, S. Hubbard, Y. Rubin, C. Murray, E. Roden, and E. Majer, Geochemical characterization using geophysical data and Markov Chain Monte Carlo methods, *EOS Transaction*, 83(47), 2002.

Rubin, Y., J. Chen, S. Hubbard, M. Kowalsky, and A. Woodbury, A structured approach to Bayesian data fusion, *EOS Transaction*, 83(47), 2002.

Hubbard, S., J. Chen, B. Mailloux, E. Majer, and Y. Rubin, Heterogeneity and bacterial transport at the Oyster, VA Site, *EOS Transactions*, 81(48), 2000.

Swift, D., M. Green, J. Chen, S. Hubbard, E. Majer, and M. Christopher, Deriving hydrofacies from lithofacies at the Oyster Virginia experimental site, *EOS Transactions*, 81(48), 2000.

Christopher, M., E. Roden, K. Overstreet, Y. Chien, J. Chen, and S. Hubbard, Spatial heterogeneity of microbial iron reduction potential at the South Oyster Focus Area, Virginia, *EOS Transactions*, 81(48), 2000.

Chen, J**.**, S. Hubbard, and Y. Rubin, Estimating hydraulic conductivity at the Oyster (VA) Site from hydrological and geophysical data by using Bayesian methods based on a normal linear model, *EOS Transactions*, 80(46), 1999.